

What is claimed is:

1-4 (Cancelled)

5. (Currently amended) An ~~The edge node of claim 4 further operable to~~ comprising:

a plurality of input ports including ingress ports for receiving data packets from subtending data sources, and inbound ports for receiving data bursts from external nodes;

a plurality of output ports including egress ports for transmitting data packets to subtending data sinks and outbound ports for transmitting data bursts, each data burst comprising at least one data packet, to external nodes;

an edge controller in communication with said input ports and output ports;

an input control port for transmitting control signals from said ingress ports and inbound ports to said edge controller; and

an output control port for transmitting control signals from said edge controller to said outbound ports and egress ports;

wherein at least one outbound port has a bimodal burst-formation device operable to compute burst-descriptors and flow-rate-allocation requirements for data bursts;

wherein said at least one outbound port transmits said burst descriptors and said flow-rate-allocation requirements to an external node;

wherein at least one inbound port receives from said external node burst-transfer schedules for waiting bursts and burst-transfer permits for forthcoming bursts;

and wherein said edge node forms multiple-source flow-rate-allocation requests each request specifying directed pairs of edge nodes, and a flow-rate for each of said pairs.

6. (Original) The edge node of claim 5 wherein at least one of said outbound ports transmits to an external controller at least one of a burst transfer request, a single-source flow-rate-allocation request, and multiple-source flow-rate-allocation requests.

7. (Currently amended) The edge node of claim ~~[[1]]~~ 5 wherein at least one of said outbound ports includes a timing circuit operable to time-lock to an external timing circuit.

8. (Currently amended) The edge node of claim ~~[[1]]~~ 5 wherein said burst-formation device ~~further includes means for interleaving~~ interleaves variable-size data bursts and regular time slots in a time frame.

9. (currently amended) A core node interconnecting a plurality of source edge nodes and sink edge nodes, said core node comprising:

input ports ~~operable to receive~~ for receiving optical signals;

output ports ~~operable to transmit~~ for transmitting optical signals; and

a core controller including a burst-descriptor generator, and

a burst scheduler;

wherein said core controller ~~is operable to~~[:]

receives multiple-source connection requests each specifying at least two source edge nodes, and for each of the at least two source edge nodes specifying:

at least one sink edge node; and

a corresponding capacity allocation[:]

receives burst-admission requests and single-source flow-rate-allocation requests from at least one of said input ports;

parses each of said multiple-source flow-rate-allocation requests to produce multiple single-source flow-rate-allocation requests;

directs single-source flow-rate-allocation requests to said burst-descriptor generator to produce a nominal burst size and a nominal inter-burst time-interval corresponding to each flow-rate allocation; and

directs said burst-admission requests and said burst descriptors to said burst scheduler;

wherein each of said burst-admission requests includes:

a request identifier;

an identifier of a requesting edge node;

a number $\gamma > 0$ of destinations for which burst-scheduling is requested;

multiple-destination burst-description records, one for each of said γ destinations, each record including:

a cyclic burst number relevant to said requesting edge node;

an identifier of a sink edge-node to which a corresponding burst is destined; and

a size of said corresponding burst.

10. (Cancelled)

11. (Currently amended) [A] The core node of claim 10 interconnecting a plurality of source edge nodes and sink edge nodes, said core node comprising:

input ports for receiving optical signals;

output ports for transmitting optical signals;

a core controller including a burst-descriptor generator, and

a burst scheduler;

wherein said core controller:

receives multiple-source connection requests each specifying at least two source edge nodes, and for each of the at least two source edge nodes specifying:

at least one sink edge node; and

a corresponding capacity allocation;

receives burst-admission requests and single-source flow-rate-allocation requests from at least one of said input ports;

parses each of said multiple-source flow-rate-allocation requests to produce multiple single-source flow-rate-allocation requests;

directs single-source flow-rate-allocation requests to said burst-descriptor generator to produce a nominal burst size and a nominal inter-burst time-interval corresponding to each flow-rate allocation; and

directs said burst-admission requests and said burst descriptors to said burst scheduler;

and

wherein said burst-descriptor generator determines burst-sizes and inter-burst intervals so that, for each specified flow-rate, the specified flow-rate multiplied by the time interval between any two successive burst transmission instants equals the size of a burst eligible for transmission at the second of said two successive burst transmission instants.

12. (Cancelled)

13. (Original) The core node of 11 wherein each of said single-source flow-rate-allocation requests includes:

- a request identifier;
- an identifier of a requesting edge node;
- a number $\kappa > 0$ of destinations for which burst-transfer permits are requested;
- multiple-destination burst-description records, one for each of said κ destination, each record including:
 - an identifier of a sink edge-node to which a burst is destined; and
 - a required flow-rate.

14. (Original) The core node of claim 11 wherein each of said multiple-source flow-rate-allocation requests includes:

- a request identifier;
- an identifier of a reporting edge node;
- a number Ψ of source nodes for which flow-rate allocations are requested;
- Ψ super-records, each super record including:
 - an identifier of a corresponding source node to said super record;
 - a number κ of destination sink nodes for which flow-rate allocations from said corresponding source node are requested;
 - κ records each record including an identifier of a sink edge-node to which burst-transfer permits are requested from said corresponding source node and a required flow-rate expressed in a prescribed unit.

15. (Original) The core node of claim 14 wherein said burst scheduler further includes means for performing temporal matching among said input ports and said output ports.

16. (Original) The core node of claim 15 wherein said burst scheduler further interleaves contiguous intervals in a time frame so that successive intervals contain variable-size data bursts and regular time slots.

17-19 (Cancelled)

20. (Currently amended) [A] ~~The network of claim 19~~ comprising:

core nodes, each core node having a core controller;

edge nodes having links to said core nodes, each edge node having an edge controller, wherein at least one edge controller:

forms multiple-source flow-rate allocation requests, each specifying flow-rate allocations from at least one edge node to at least one other edge node, and

directs said multiple-source flow-rate allocation requests to at least one core node;

a burst-transfer regulator in said at least one core node, the burst transfer regulator generates burst-transfer permits to comply with a flow-rate constraint;

wherein a subset of said edge nodes forms an embedded network and each edge node in said subset communicates with a controller of said embedded-network.

21. (Original) The network of claim 20 wherein said embedded-network controller modifies said flow-rate allocation requests according to traffic data it receives from at least one of said edge nodes.

22-27 (Cancelled)